

In the matter of the Commissions of Inquiry Act 1908

And

In the matter of the Canterbury Earthquakes Royal Commission

Statutory declaration of Henry John Hare

Date: 18 November 2011



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I, **Henry John Hare**, of Holmes Consulting Group Limited, Unit 5, 295 Blenheim Road, Upper Riccarton, Christchurch, do solemnly and sincerely declare that:

Qualifications and Experience

- 1 My full name is Henry John Hare.

- 1 I am a Director of Holmes Consulting Group Limited ('HCG'). I have a Bachelor of Engineering (Civil) with Honours, and am a Chartered Professional Engineer. I hold professional memberships with the Institution of Professional Engineers, the Structural Engineering Society (of which I am the current President) and the New Zealand Society of Earthquake Engineering. In addition I am a licensed Professional Engineer in California.


- 2 I have over 25 years of experience in structural engineering in New Zealand, England, Hong Kong and the United States, where I was resident from 2000 to 2005. The majority of my professional career has been with HCG, where I have worked at various times in Auckland, New Plymouth and Christchurch. My project experience has been mainly in buildings, with a combination of both new building design and evaluation and strengthening of existing buildings. I am currently seconded for the majority of my time to CERA where I am the acting Principal Engineering Adviser.

Scope of Evidence

- 3 I, on behalf of HCG, swear this declaration pursuant to the Canterbury Earthquakes Royal Commission's letter dated 17 October 2011 relating to the Pyne Gould Corporation building ('PGC Building').

Schedule of Observations of Damage

- 4 I am asked whether HCG, as the Engineers who inspected the PGC Building, agree that the Schedule of Observations of Damage as is attached to the Canterbury Earthquakes Royal Commission's letter dated

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17 October 2011 accurately records damage to the PGC Building at the times stated.

Response

- 5 The extent of the damage as observed by HCG's inspection engineers, who carried out site inspections on 7 and 16 September 2010, 15 October 2010 and mid to late January 2011 are set out in the RAPID Level 2 evaluation report and site reports, copies of which have previously been supplied to the Canterbury Earthquakes Royal Commission under cover of my letter dated 5 October 2011.
- 6 Representative photographs were also taken during the course of the inspection undertaken on 16 September 2010. These photographs were copied to disc and supplied to the Canterbury Earthquakes Royal Commission under cover of my letter dated 5 October 2011.
- 7 A schedule summarising the primary damage observed by the inspection engineers and the positioning of the damage observed during the inspection undertaken on 16 September 2010, from recollection, was prepared in April/May 2011. A copy of this schedule was supplied to the Canterbury Earthquakes Royal Commission under cover of my letter dated 5 October 2011.
- 8 Given the passage of time, the inspection engineers advise me that they have little further specific recollection of the exact location or size of specific cracks or damage observed, save as is recorded in the HCG documentation produced as a result of the inspections carried out.
- 9 In the opinion of the inspection engineers who carried out the inspections of the PGC Building, the damage observed was relatively minor and not indicative of a building under immediate distress or having a significantly impaired resistance to earthquake shaking.

Original Design and Construction

- 10 I am asked to comment on 'whether the PGC Building as originally designed and constructed complied with earthquake risk and other legal and best practice requirements that were current at that time'.

Response

- 11 I am led to understand that the PGC Building was designed in or around 1963 and constructed in or around 1966. The building was designed originally by I L Holmes, a predecessor company of HCG, for the Christchurch Drainage Board.
- 12 Beca Carter Hollings and Ferner Limited ('Beca') has been commissioned by the New Zealand Department of Building and Housing to undertake an investigation into why the PGC Building collapsed during the magnitude 6.3 earthquake that struck Christchurch on 22 February 2011. In its report dated 26 September 2011, Beca confirms that (having had access to structural drawings dated 1963, Christchurch City Council's property file dating from 1978 to August 2010 and structural engineers' reports and site notes from 1997 to 2011) the building appears to have complied generally with the design standards and practices of 1963.
- 13 HCG has not specifically considered in detail whether the building was fully code compliant at the time of the design, but there is no reason to believe it would not have complied. Having considered Beca's report, I do not disagree with its conclusion that the building appears to have complied generally with the design standards and practices of 1963.

Alterations and Maintenance

- 14 I am asked 'whether the PGC Building as altered and maintained complied with earthquake risk and other legal and best practice requirements that were current at the time of the alterations and maintenance'

Response

- 15 I am unable to comment on any alterations and maintenance works carried out to the PGC Building save for those alterations and/or maintenance carried out with the involvement of HCG.

Maintenance

- 16 As far as I am aware, HCG has been consulted on various occasions but has never had any specific responsibility for the general maintenance of the PGC Building. I am unaware of the level of maintenance carried out to the building.
- 17 The only maintenance works carried out with the involvement of HCG, of which I am specifically aware, were carried out in early 2009. HCG was instructed to review the deterioration of the exterior concrete frames. At several locations, there was evidence of what is known as concrete cancer, where corrosion of the reinforcement has caused the cover concrete to spall. At that time repairs to selected areas were carried out by Contech, who were engaged by HCG on behalf of the owner of the PGC Building.

Alterations

- 18 In or around April 1997, HCG was instructed by Warren & Mahoney Architects, acting for PGC as potential purchaser of the PGC Building, to evaluate the building for earthquake effects based on the requirements of NZS4203. HCG's report is copied at pages 1-21 of 'HJH1'. As a result, steel support posts were installed to provide back-up to the exterior precast column elements above the ground floor. Copies of the relevant building consent (strengthening detail) plans are copied at pages 22-25 of 'HJH1'.
- 19 HCG's calculations and sketches dated 2 July 2007, the outline structural specification report dated 31 October 2007, the producer and construction monitoring statements dated 31 October 2007 and the



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project features report dated 1 November 2007 are copied at pages 26-60 of 'HJH1'.

- 20 Further alterations were carried out by HCG in or around 2008.
- 21 I believe that all works carried out by HCG to the PGC Building complied with the accepted standards at the time such works were carried out. The seismic capacity of the building as altered was judged to have exceeded the minimum standard required by the Building Act for existing buildings at the time.

Seismic Evaluation

- 22 I am asked to comment on the conclusions reached in the seismic evaluation carried out in 1997 and the recommendations made as a result.

Response

- 23 A copy of the Seismic Evaluation Report prepared by HCG is as copied at pages 1-21 of 'HJH1'. The conclusions reached by HCG are set out on page 17 of the report. At the time, it was considered that the PGC Building capacity was limited by the perimeter column rotations to between 33% and 50% of the current code loading at that time.
- 24 Assuming this weakness was addressed, HCG assessed that the building capacity would increase above 50%, limited by the strength of the main shear walls. No specific capacity was given for the walls, although it was noted that the assessed 'threshold for severe damage' was predicted to be reached at approximately 60% of full code loading at the time. This exceeded the required capacity to satisfy the Earthquake Prone Building policy of the day.
- 25 HCG recommended that, at the very least, secondary support columns be installed to mitigate the outcome of any column rotation failure.

- 26 As a result of HCG's report and following consultation with the client, steel support posts were installed to provide backup to the exterior concrete column elements above the ground floor of the building.

The PGC Building's compliance as at 4 September 2010

- 27 I am asked 'whether the PGC Building complied with earthquake risk and other legal and best practice requirements that were current as at 4 September 2010'

Response

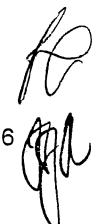
- 28 HCG has not been engaged to perform any specific detailed quantitative evaluation to determine whether the PGC Building complied with earthquake risk and other legal and best practice requirements that were current as at 4 September 2010. However, at the time of HCG's review in 2009, HCG concluded that the PGC Building was unlikely to be considered Earthquake Prone (given the Earthquake Prone Building threshold of 33%). This conclusion was reached after having undertaken a brief comparison between the code as at the time of the 1997 review and that existing in 2009. As there was relatively minimal difference between the loadings standards (NZS4203:1984 and AS/NZS1170.5:2004), it was considered that there was little material change in the overall strength relative to the code. The Beca report dated 26 September 2011 comments upon this issue in greater detail.

Inspections post 4 September 2010

- 29 I am asked to comment upon 'the nature and effectiveness of inspections that were carried out between 4 September 2010 and 22 February 2011.'

Response

- 30 HCG carried out inspections of the PGC Building on 7 September 2010, 16 September 2010, 15 October 2010 and mid to late January 2011. Instructions were received from NAI Harcourts, who were the building owner representatives. HCG were engaged to carry out an 'initial

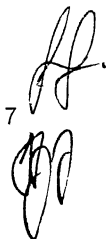


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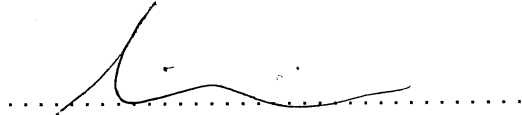
earthquake inspection' and 'securing measures as considered necessary'. A copy of the documentation relating to our engagement was supplied to the Canterbury Earthquakes Royal Commission under cover of my letter dated 5 October 2011.

- 31 All inspections were carried out in compliance with Level 2 post earthquake inspection requirements, taking into account the verbal briefings given by Christchurch City Council/Civil Defence in regard to what was expected from Level 2 assessments. Such inspections generally comprise a rapid visual inspection to identify any obvious signs of damage that might result in significant diminished structural capacity. The inspections are, by their very nature, brief and are not expected to include any plan review or analysis of the building or any sort of invasive inspection of the structural elements.
- 32 This level of inspection was generally considered appropriate for determining whether buildings were suitable for occupation, subject to recommendations for further detailed assessment.
- 33 At no stage, as far as I am aware, was HCG requested to undertake detailed assessments.
- 34 The extent of the damage, as observed by HCG's inspection engineers during their inspections, was not indicative of a building under immediate distress or having a significant impaired resistance to earthquake shaking.

AND I MAKE this solemn declaration contentiously believing the same to be true and by virtue of the Oaths and Declarations Act 1957.

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Sworn at
on (8 November 2011
before me:

A handwritten signature in black ink, appearing to be 'M. J. Sinclair', written over a horizontal dotted line.A handwritten signature in black ink, appearing to be 'Olivia Jane Sinclair', written over a horizontal dotted line.

~~(Deputy) Registrar~~
Solicitor of the High Court of New Zealand
~~Justice of the Peace~~

Olivia Jane Sinclair
Solicitor
Christchurch